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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/079,468	02/19/2002	Christopher M. Fender	399483	6678

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EXAMINER	
WHALEY, PABLO S	

ART UNIT	PAPER NUMBER
1631	

NOTIFICATION DATE	DELIVERY MODE
02/04/2010	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

patent@lathropgage.com

Office Action Summary	Application No.	Applicant(s)	
	10/079,468	FENDER ET AL.	
	Examiner	Art Unit	
	PABLO WHALEY	1631	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on _07 October 2009_.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _1-4 and 8-34_ is/are pending in the application.

4a) Of the above claim(s) _14-19 and 21-34_ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) _1-4,8-13 and 20_ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Status of Claims

Claims 1-4 and 8-34 are pending. Claims 1-4, 8-13, and 20 are under consideration. Claims 5-7 have been cancelled.

Withdrawn Rejections

The rejection of claim 20 under 35 U.S.C. 101 is withdrawn in view of applicant's amendment filed 10/07/2009.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.
>
> This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1, 2, 4, 8-13 and 20 are rejected under 35 U.S.C. 103(a) as being obvious over Qiu et al. (Journal of Nematology, 1997, Vol. 29, No. 4, 523-530, in the IDS filed 4/7/2003), in view of Yuhara (Res. Bull. Hokkaido National Agricultural Experiment Station, 1975, No. 111, p.91-100; Japenese Translation Document), in view of Rutherford (Journal of Chemical Ecology, 1998, Vol. 24, No. 9, p.1447-1463).

The claims are drawn to a method for predicting the soybean cyst nematode resistance of a soybean sample comprising: (a) obtaining a spectroscopic scan of a soybean sample by using a spectrometer to provide an assay spectra over a predetermined frequency range; (b) comparing the assay spectra with a predictive model based upon spectra obtained over the predetermined frequency range from individual base samples selected from at least the group consisting of known soybean cyst nematode resistant genotypes, known soybean cyst nematode susceptible genotypes, mud known genotypes with varying levels of resistance to soybean cyst nematode, said comparison between the assay spectra and the predictive model being conducted by using a discriminant analysis based upon the predictive model, wherein the discriminant analysis includes a regression analysis by comparing peak intensity within the predetermined frequency range between the assay spectra and the corresponding spectra; and (c) predicting the soybean cyst nematode resistance of the soybean sample based upon the comparison results between the assay spectra and the predictive model.

Qiu teaches methods for preparing soybean seed samples infected with nematodes (p.524, Col. 2). Nematode susceptible and nematode resistant samples are used for experimentation (Fig. 2). A colorimetric assay (p.525, Col. 1, para. 2) and (Fig. 1) is used to determine chitinase activity by measuring the absorbance of soybean root supernatant (i.e. soybean sample) spectrophotometrically at 550 nm. Qiu shows that chitinase enzyme is associated with nematode resistance and susceptibility in the soybean (Abstract). Qui compares time-course chitinase activity for proteins from susceptible soybean cultivar and resistant cultivar, both with and without infection [Fig. 1]. Qiu also suggests extending their investigation of nematicidal activity to other root know nematodes [p.529, Col. 1, last three lines].

Qiu does not specifically teach the use of obtaining a spectroscopic scan to provide assay spectra over a predetermined frequency range comprising near-infrared, as in claims 10, 11, 12, and 20.

Qiu does not specifically teach predicting SCN resistance based on comparing assay spectra and a predictive model, as in claims 1 and 12.

Yuhara teaches a method for detecting soybean cyst nematode (SCN) injury to soybean plants using infrared and multispectral imaging [See pages 91-93 of Japanese Translation Document]. The test system includes taking infrared pictures of soybean plants with and without soybean cyst nematode inoculation and comparing results [p.91-92, Section 2, Test Methods and Section 3, Test Results, Table 2, Table 3], which shows comparing plants with known SCN susceptible genotypes. A multispectral camera was used for analyzing spectral scans of soybean leaves for nematode injury [p.4, ¶2 and p.99, Fig. 1], which shows obtaining spectroscopic scans using a spectrometer.

Rutherford teaches a method for predicting the resistance of sugarcane to E. saccharina [Abstract] based on NIR spectroscopic scans of sugarcane samples are obtained over a predetermined frequency range (p. 1449, Near Infrared). Spectral data is analyzed using multiple linear regression analysis with a small number of selected wavelengths (p.1450, ¶3 and ¶4) and the SELECT spectral algorithm is used to construct calibration and validation sets for the predictive and (p.1451, Results) and determine detectable chemical differences indicative of resistance or susceptibility (p.1452, ¶3). The model allows for discrimination based on several difference chemical characteristics including protein (Table 1). The calibration sets are used to predict resistance and susceptibility by comparing differences in absorbance profiles (p.1454).

It would have been obvious to someone of ordinary skill in the art at the time of the instant invention to modify the method of Qiu by obtaining a spectroscopic scan to provide assay spectra over a predetermined frequency range comprising near-infrared frequencies, as in claim 1, since Yuhara shows that the present or absence of SCN infestation in soybean plants can be detected using the infrared frequency range, as shown above, and since Rutherford shows that near-infrared scans are commonly used in disease resistance assays. The motivation would have been to apply remote sensing technology for detecting diseased soybean plants, as suggested by Yuhara p. 94, ¶3].

It would have been obvious to someone of ordinary skill in the art at the time of the instant invention to modify the method of Qiu by predicting SCN resistance based on comparing assay spectra and a predictive model, as in claim 1, since Rutherford predicts resistance and susceptibility based on NIR spectroscopic scans using a spectral algorithm (p.1451, Results, p.1452, ¶3), since Yuhara shows that spectral data for detecting soybean cyst nematode (SCN) injury to soybean plants can be obtained with predictable results, as set forth above, and since Qiu suggests extending their investigation of nematicidal activity to other root knot nematodes [p.529, Col. 1, last three lines]. The motivation would have been to provide a remote and low-cost method for predicting resistance in soybean plants [Rutherford, p.1448, ¶5].

Claims 1-4, 8-13, and 20 are rejected under 35 U.S.C. 103(a) as being obvious over Qiu et al. (Journal of Nematology, 1997, Vol. 29, No. 4, 523-530, in the IDS filed 4/7/2003), in view of Yuhara (Res. Bull. Hokkaido National Agricultural Experiment Station, 1975, No. 111, p.91-100; Japenese Translation Document), in view of Rutherford (Journal of Chemical Ecology, 1998, Vol. 24, No. 9, p.1447-1463), and in view of Borggaard et al. (Anal. Chem. 1992, 64:545-551) and in view of Marek et al. (Crop Sci., 2000, Vol. 40, p. 713–716).

Qiu, Yuhara, and Rutherford make obvious a method of claims 1, 2, 4, 8-13 and 20 for predicting the soybean cyst nematode resistance of a soybean sample, as set forth above.

Qiu, Yuhara, and Rutherford do not teach predicting soybean cyst nematode resistance in a soybean seed sample, as in claim 3.

Qiu, Yuhara, and Rutherford do not teach natural intelligent algorithms as recited in claim 9.

Borggaard et al. teach the use of neural networks for optimally interpreting NIR spectra for classifying samples [Abstract and p. 546, Section I], as in claim 9. More specifically, said neural networks

are used to compare results and predict fat in homogenized meat products using NIR spectral data [Table II] and [Fig. 6].

Marek teaches determining disease resistance in tall fescue seedlings using near-infrared spectroscopy (NIRS). In particular, resistance is determined on the basis of chitinase activity as measured by NIR spectral scans (Abstract and p. 714, Methods and Materials, Col. 1).

It would have been obvious to someone of ordinary skill in the art at the time of the instant invention to modify the predictive model made obvious by Qiu, Yuhara, and Rutherford using natural intelligent algorithms, as in claim 9, since Borggaard teaches neural networks for classifying NIR spectral samples [Abstract and p. 546, Section I, Table II, Fig. 6] with predictable results. The motivation would have been improve analysis of soybean NIR spectral data by using a learning algorithm that improves predictive power and reduces spectral noise, as suggested by Borggaard (p.550, Section VIII).

It would have been obvious to someone of ordinary skill in the art at the time of the instant invention to modify the predictive model made obvious by Qiu, Yuhara, and Rutherford by predicting soybean cyst nematode resistance in a soybean seed samples, as in claim 3, since chitinase is a known marker for determining soybean resistance to nematodes, as shown by Qiu, and since NIR spectroscopy is a known technique for detecting chitinase activity in seedling samples, as shown by Marek. The motivation would have been to use near-infrared spectroscopy (NIRS) for measuring chitinase activity to determine disease resistance in seedlings [Marek, Abstract and p. 714, Methods and Materials, Col. 1].

Response to Arguments

Applicant's arguments, filed 10/07/2009 have been fully considered but are not persuasive for the following reasons.

Applicant states that Qiu, Marek, Rutherford do not teach that chitinase activity in an uninfected soybean sample can be used to predict SCN susceptibility. In response, applicant's arguments are directed to features (i.e. uninfected samples or predicting SCN resistance in future plants grown from assayed

seed) that are not recited in the instant claims and the claims have not been amended to reflect these limitations.

Applicant states that Qiu specifically does not teach or suggest predicting SCN resistance. In response, Qui was not relied upon as a teaching for this limitation, as was acknowledged in the previous office action and is reiterated in the Office action above. Rutherford teaches a method for predicting the resistance of sugarcane to E. saccharina [Abstract] based on NIR spectroscopic scans of sugarcane samples are obtained over a predetermined frequency range (p. 1449, Near Infrared). Yuhara teaches a method for detecting soybean cyst nematode (SCN) injury to soybean plants using infrared and multispectral imaging [See pages 91-93 of Japanese Translation Document]. The test system includes taking infrared pictures of soybean plants with and without soybean cyst nematode inoculation and comparing results, as set forth above. It would have been obvious to someone of ordinary skill in the art at the time of the instant invention to modify the method of Qiu by predicting SCN resistance based on comparing assay spectra and a predictive model, as in claim 1, since Rutherford predicts resistance and susceptibility based on NIR spectroscopic scans using a spectral algorithm (p.1451, Results, p.1452, ¶3), since Yuhara shows that spectral data for detecting soybean cyst nematode (SCN) injury to soybean plants can be obtained with predictable results, as set forth above, and since Qiu suggests extending their investigation of nematicidal activity to other root knot nematodes [p.529, Col. 1, last three lines]. The motivation would have been to provide a remote and low-cost method for predicting resistance in soybean plants [Rutherford, p.1448, ¶5].

Applicant states that Qui teaches away from the instant invention by suggesting that chinase activity is not a good indicator for predicting susceptibility. However, not specific location of Qui is referenced in applicant's remarks [p.11]. In addressing the teaching away argument, not only does Qui not teach away but Qui shows that chitinase enzyme is associated with nematode resistance and susceptibility

in the soybean (Abstract) and suggests extending their investigation of nematicidal activity to other root know nematodes [p.529, Col. 1, last three lines].

In response to applicant's arguments that one of ordinary skill would not know that NIR scans of a soybean sample can be used to predict nematode susceptibility, this is an assertion of an unexpected result. The MPEP Section 716.01(c) states that unexpected results must be established by factual evidence. Applicant's have not presented any experimental data showing that NIR scans of a soybean sample results in an unexpected advantage of predicting nematode susceptibility. Due to the absence of such evidence, applicant's assertion of unexpected results constitutes mere argument. See also In re Linder, 457 F.2d 506, 508, 173 USPQ 356, 358 (CCPA 1972; Ex parte George, 21 USPQ2d 1058 (Bd. Pat. Appl. & Inter. 1991).

Applicant states that Borggaard and Marek do not cure the arguments set forth above. In response, this argument is not persuasive for the reasons set forth above.

Therefore, the examiner maintains that the combination of references teaches and/or makes obvious the claimed limitations.

Notice of Change to Docketing of Requests for Continued Examination

Applicant is reminded of the change in docketing of Requests for Continued Examination set forth in the online OG Notice of 10 November 2009 (*1348 OG 254*; http://www.uspto.gov/web/offices/com/sol/og/2009/week45/TOC.htm#ref14).

Conclusion

No claims are allowed.

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing

date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Pablo Whaley whose telephone number is (571)272-4425. The examiner can normally be reached between 12pm-8pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Marjorie Moran can be reached at 571-272-0720. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Pablo S. Whaley

Patent Examiner

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Primary Examiner, Art Unit 1631